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SOURCE Vestnik Mashinostroyeniya, No 4, 1952.URGENT PROBLEMS IN THE FIELD OF SOVIET COLD-FORMING TECHNOLOGY

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Cold forming on presses, which is assuring the mass production of a variety of items, is being disseminated ever more widely in machine building. The relative proportion of this type of metalworking at many enterprises is noteworthy. For example, more than 60 percent of series-produced parts for modern light automobiles are being put out by cold forming, while work is going on constantly on modernizing the designs of machine parts and units in conformance with the conditions of their manufacture by cold forming. Now, for example, section forming of an important part such as the cylinder block of an automobile engine is no longer considered unfeasible. Forming a block from sheet steel will make the automobile engine considerably lighter in weight and will improve its quality.

The basic advantage of cold forming of metal as compared with other methods such as machining, casting, free forging, etc., is the large saving in metal. In addition, the parts produced by cold forming usually meet all design requirements and possess all necessary mechanical properties and operational durability; certain types of products can be manufactured to conform with specified requirements only by the cold-forming method.

The second advantage of cold forming is its high productivity. Modern high-speed automatic presses make more than 200 working strokes per minute. This makes it possible to obtain 12,000 or more finished items per hour. On an average, a cold-forming press can produce from 100 to 2,000 items per hour (the former figure refers to especially large and complex items such as automobile bodies, all-metal railroad cars, etc.).

Finally, the third advantage of cold forming is the high degree of interchangeability of parts obtained, which is a very important condition in mass production.

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The big saving in electric power and secondary materials and the possibility of being limited by small production areas should also be taken into account. These advantages definitely indicate the need for the very broadest introduction of cold forming into production.

Nonetheless, this problem has not been given sufficient attention. The Ministry of Machine-Tool Building USSR is introducing new types of press equipment into production very slowly. The presently available official catalogue on press and forging equipment produced by plants of this ministry include only about 20 types of presses for cold forming, at a time when the requirements of industry are considerably greater. In addition to modern automatic presses, the catalogue includes obsolete presses or presses having serious design deficiencies which encumber their operation. The list of types of powerful crank presses, in particular those with a large table working surface, is small; meanwhile, there is a big demand in Soviet industry (especially the automobile industry) for these presses, the manufacture of which was mastered long ago at domestic heavy-machine-building plants. In view of this, the consumer plants have to manufacture their own presses of the required types, which leads to the output of nonstandard and nonunified press equipment.

The obstacle to extensive introduction of cold forming is the high cost of producing dies. Even at large-scale plants having highly skilled personnel and specialists in die production, the manufacture and adjusting of dies costs approximately 1,000 rubles for one technological operation. Many plants are not in a position to master the manufacture of dies. To overcome these difficulties, it is necessary to organize the manufacture of dies at large-scale specialized tool enterprises--die plants. The centralized manufacture of dies will permit the wide application of standardization and normalization of their design elements and will make it possible to organize constant-flow production of dies with the utilization of a new technique, in this way lowering their cost of manufacture sharply. Unfortunately, at present, the construction of special die plants has not been provided for in the plans of the respective ministries.

The fact that this branch of technology has practically no scientific research base does not contribute to the more rapid dissemination of cold forming. With special exceptions, not one enterprise, including the very largest plants, has special laboratories for cold forming.

The problems of cold-forming technology are given very little space in the work plans of scientific research institutes of a branch of industry, and at most institutes, there are neither special laboratories nor qualified technical personnel familiar with the essentials of cold forming.

Meanwhile, there are still many unsolved theoretical questions, connected with important production problems in the field of cold forming.

There could be more automatization and mechanization of labor in cold forming than in any other field of metalworking technology; yet, little has been done to work out these problems. A suitable scientific center which could unite and head experimental research and practical work in this field has not been created. On the whole, only the Institute of Technical and Economic Information of Gosplan USSR has indulged in the dissemination and interchange of experience in the field of cold-forming techniques. The subject of cold forming is virtually untouched in dissertations. All this emphasizes the above-described opinion about the lack of attention paid to scientific work in the field of cold-forming technology.

A number of higher technical institutions such as the Moscow Machine Tool and Tool Institute, the MVTU (Moscow Higher Technical School), etc., are training specialists and engineers in cold forming and have a highly qualified professor-teaching staff; that is they have all the facilities for extensive development of research work in this field.

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This work must be conducted on the basis of creative association with leading enterprises. Scientific workers must help plants in organization of specialized laboratories, the development of methods of research work, etc. The forming and forging section of VNITOMASH (All-Union Scientific Engineering-Technical Society of Machine Builders) must also help in solving these problems.

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